

**REMARKS/ARGUMENTS**

**Applicant submits that the amendments and remarks in this Second Amendment Under 37 C.F.R. § 1.111 ("Second Amendment") render each of claims 1-48 allowable. If the Examiner does not agree, Applicant requests that the Examiner contact John A. Castellano, Reg. No. 35,094, at 703.668.8000—as soon as possible—in order to establish a mutually agreeable time for a personal interview at the U.S. Patent and Trademark Office ("USPTO").**

In this Second Amendment, Applicant amends claim 34 in order to better define the claimed invention; amends claim 39 in order to correct typographical errors; and amends claim 43 in order to improve clarity. No new matter is introduced.

No amendments are made in response to the Examiner's rejections under 35 U.S.C. § 103(a).

Prior to entry of the Second Amendment, claims 1-48 were pending in the application. After entry of the Second Amendment, claims 1-48 remain pending in the application.

In the Office Action, the Examiner appears<sup>1</sup> to have rejected claim 34 under 35 U.S.C. § 112, ¶ 2; rejected claims 1-4 and 21-23 under 35 U.S.C.

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<sup>1</sup> As discussed under the heading "Discerning the Rejections Under 35 U.S.C. § 103(a)," Applicant notes that the Office Action contains conflicting and inconsistent information regarding the rejections under 35 U.S.C. § 103(a).

§ 103(a) as being unpatentable over U.S. Patent Publication No. 2003/0099287 A1 to Arambepola ("Arambepola") in view of U.S. Patent No. 5,692,010 to Nielsen ("Nielsen"); rejected claims 5-7 and 24-26 under 35 U.S.C. § 103(a) as being unpatentable over Arambepola in view of Nielsen, and further in view of U.S. Patent No. 6,920,194 B2 to Stopler et al. ("Stopler"); rejected claims 8-10, 27, and 28 under 35 U.S.C. § 103(a) as being unpatentable over Arambepola in view of Nielsen, further in view of Stopler, and yet further in view of European Patent Application No. 1,178,642 A2 to Belotserkovsky et al. ("Belotserkovsky"); rejected claims 11, 12, 29, and 30 under 35 U.S.C. § 103(a) as being unpatentable over Arambepola in view of Nielsen, and further in view of Belotserkovsky; rejected claims 13, 14, 31, and 32 under 35 U.S.C. § 103(a) as being unpatentable over Arambepola in view of Nielsen, further in view of Stopler, and yet further in view of "Equalization of OFDM-Systems by Interference Cancellation Techniques" by Toeltsch et al. ("Toeltsch"); rejected claims 15 and 33 under 35 U.S.C. § 103(a) as being unpatentable over Arambepola in view of Nielsen, further in view of U.S. Patent Publication No. 2002/0061081 A1 to Richards et al. ("Richards"), and yet further in view of Belotserkovsky; rejected claims 16, 17, 35-38, 41, and 42 under 35 U.S.C. § 103(a) as being unpatentable over Arambepola in view of Nielsen, further in view of Stopler, yet further in view of Belotserkovsky, and still further in view of U.S. Patent Publication No. 2003/0035469 A1 to Frank et al. ("Frank"); rejected claims 18 and 19 under 35 U.S.C. § 103(a) as being

unpatentable over Arambepola in view of Nielsen, further in view of European Patent Application No. 1,043,874 A2 to Nokes et al. ("Nokes"), and yet further in view of European Patent Application No. 1,011,235 A2 to Greenwood ("Greenwood"); rejected claims 20 and 39 under 35 U.S.C. § 103(a) as being unpatentable over Arambepola in view of Nielsen, and further in view of Belotserkovsky; rejected claims 43-45 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 7,031,410 B1 to Schenk et al. ("Schenk") in view of U.S. Patent No. 6,047,022 to Reuven ("Reuven"); and rejected claims 46-48 under 35 U.S.C. § 103(a) as being unpatentable over Arambepola in view of Nielsen, and further in view of Belotserkovsky.

The Examiner also objected to claims 34 and 40, but indicated they would be allowable if rewritten in independent form to include all of the limitations of the base claim and any intervening claims. Applicant gratefully acknowledges the Examiner's statement that claims 34 and 40 would be allowable.

Applicant respectfully traverses the Examiner's rejections of claims 1-33, 35-39, and 41-48 under 35 U.S.C. § 103(a).

#### Drawings

Applicant notes that the Form PTOL-326 in the Office Action mailed on April 4, 2008, does not indicate the status of the drawings filed on March 23, 2004, and December 12, 2007.

Applicant requests that the Examiner indicate the status of the drawings in the next paper mailed by the USPTO.

Rejection Under 35 U.S.C. § 112, ¶ 2

As suggested by the Examiner, Applicant amends claim 34 to recite “or” instead of “and”. Applicant submits that this amendment obviates the rejection of claim 34 under 35 U.S.C. § 112, ¶ 2.

Discerning the Rejections Under 35 U.S.C. § 103(a)

Applicant notes that the Office Action contains conflicting and inconsistent information regarding the rejections under 35 U.S.C. § 103(a).

For example, the Form PTOL-326 states that claims 1-35 and 37-49 are rejected, and that claims 36 and 40 are objected to. There is no pending claim 49. If claim 40 is objected to, then it is not rejected. Later, the Office Action states that claims 34 and 40 are objected to, while claim 36 appears to be rejected.

In another example, on page 8, § 2, the Office Action purports to reject claims 1-20, 34, and 46. Yet the discussion that follows in §§ 3-8 addresses claims 1-4 and 21-23.

On page 10, § 9, the Office Action purports to reject claims 5 and 24. However, the discussion that follows in §§ 10-13 addresses claims 5-7 and 24-26.

On page 11, § 14, the Office Action purports to reject claims 8 and 27. Then again, the discussion that follows in §§ 15-17 addresses claims 8-10, 27, and 28.

On page 12, § 18, the Office Action purports to reject claim 11. But the discussion that follows in §§ 19 and 20 addresses claims 11, 12, 29, and 30.

On page 13, § 21, the Office Action purports to reject claims 13 and 31. On the other hand, the discussion that follows in §§ 22 and 23 addresses claims 13, 14, 31, and 32.

On page 16, § 27, the Office Action purports to reject claims 16, 17, 35-37, 41, and 42. In contrast, the discussion that follows in §§ 28-30 addresses claims 16, 17, 35-38, 41, and 42 (i.e., also claim 38).

On page 17, § 31, the Office Action purports to reject claim 18. Nevertheless, the discussion that follows in §§ 32-34 addresses claims 18 and 19.

On page 18, § 35, the Office Action purports to reject claim 20. In spite of this, the discussion that follows in §§ 36-38 addresses claims 20 and 39.

On page 19, § 39, the Office Action purports to reject claims 43 and 44, though the discussion that follows in §§ 40-42 addresses claims 43-45.<sup>2</sup>

Additionally, the Office Action indicates that claim 34 would be allowable. However, it also appears to reject claims 35-38, all of which depend directly or indirectly from claim 34. Applicant submits that if claim 34 is

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<sup>2</sup> Applicant notes that § 42 states: "Regarding claim 45, which corresponds to claim 2, has already been rejected based on the combined teaching above." Despite this statement, Applicant is unable to locate such a previous rejection of claim 45 in the Office Action.

allowable, then claims 35-38 also must be allowable for at least the same reason or reasons that claim 34 is allowable.

Similarly, the Office Action indicates that claim 40 would be allowable. Nonetheless, it also appears to reject claims 41 and 42, both of which depend directly or indirectly from claim 40. Applicant submits that if claim 40 is allowable, then claims 41 and 42 also must be allowable for at least the same reason or reasons that claim 40 is allowable.

Applicant respectfully requests that the Examiner sort out—and then properly and consistently identify—exactly which claims are rejected, objected to, and allowed in the next paper mailed by the USPTO.

Rejections Under 35 U.S.C. § 103(a)—Claims 1-19

Applicant submits that the Examiner has failed to establish a proper prima facie case of obviousness of claim 1 for at least the following reasons.

First, Arambepola does not disclose an “equalized signal”, as admitted in the Office Action at p. 9/§ 4. Thus, Arambepola cannot disclose “estimating impulse noise in the equalized signal”, as recited in claim 1 (emphasis added).

Second, because Arambepola does not disclose an “equalized signal”, it also cannot disclose “removing a portion of the noise from the equalized signal as a function of the estimated impulse noise”, as recited in claim 1 (emphasis added).

Third, the Office Action states: “Nielsen does teach this feature in Figures 1, 2 and 4” (Office Action, p. 9/§ 4). Applicant understands this

statement to admit that while Nielsen may disclose an equalized signal, it does not disclose “estimating impulse noise in the equalized signal”, as recited in claim 1.

Fourth, Nielsen does not disclose “estimating impulse noise in the equalized signal” (emphasis added). Instead, it discloses “remov[ing] or nullif[ying] any impulse noise that exceeds” a threshold that is “arbitrarily set based upon empirical data and the environment in which the system operates” from “the error signal developed by the error generator 28”. Nielsen, c. 2, l. 46 – c. 3, l. 3 (emphasis added). Applicant submits that because impulse noise is removed from the error signal developed by the error generator, it is not estimated in the equalized signal.

Fifth, Nielsen does not disclose “removing a portion of the noise from the equalized signal as a function of the estimated impulse noise” (emphasis added). Instead, it discloses “remov[ing] or nullif[ying] any impulse noise that exceeds” a threshold that is “arbitrarily set based upon empirical data and the environment in which the system operates” from “the error signal developed by the error generator 28”. Id. (emphasis added). Applicant submits that because impulse noise is removed from the error signal developed by the error generator, it is not removed from the equalized signal.

Sixth, Nielsen does not disclose “removing a portion of the noise from the equalized signal as a function of the estimated impulse noise” (emphasis added). Instead, it discloses “remov[ing] or nullif[ying] any impulse noise that

exceeds” a threshold that is “arbitrarily set based upon empirical data and the environment in which the system operates” from “the error signal developed by the error generator 28”. *Id.* (emphasis added). Applicant submits that because the threshold is arbitrarily set, it is not a function of the estimated impulse noise and, thus, a portion of the impulse noise is not removed from the equalized signal as a function of the estimated impulse noise.

Therefore, Applicant submits that no proper combination of Arambepola and Nielsen teaches or suggests “estimating impulse noise in the equalized signal” or “removing a portion of the noise from the equalized signal as a function of the estimated impulse noise”, as recited in claim 1. Applicant further submits that the Office Action does not allege that Belotserkovsky, Frank, Greenwood, Nokes, Richards, Reuven, Schenk, Stopler, Toeltsch, and the other art of record overcomes the deficiencies discussed above with respect to Arambepola and/or Nielsen.

For all of these reasons, Applicant submits that independent claim 1 is patentable under 35 U.S.C. § 103(a) over Arambepola, Belotserkovsky, Frank, Greenwood, Nielsen, Nokes, Richards, Reuven, Schenk, Stopler, Toeltsch, and the other art of record, either alone or in any proper combination. Applicant further submits that dependent claims 2-19 are patentable under 35 U.S.C. § 103(a) over Arambepola, Belotserkovsky, Frank, Greenwood, Nielsen, Nokes, Richards, Reuven, Schenk, Stopler, Toeltsch, and the other art of record, at



least for the same reason that claim 1 is patentable, from which claims 2-19 directly or indirectly depend.

Rejections Under 35 U.S.C. § 103(a)—Claims 20-42

Applicant submits that the Examiner has failed to establish a proper prima facie case of obviousness of claim 20 for at least the following reasons.

First, Arambepola does not disclose an “equalized signal”, as admitted in the Office Action at p. 9/§ 4. Thus, Arambepola cannot disclose “a total-noise estimator operable to estimate total noise in the equalized signal from the equalizer”, as recited in claim 20 (emphasis added).

Second, because Arambepola does not disclose an “equalized signal”, it also cannot disclose “an impulse-noise estimator operable to estimate impulse noise based on the estimated total noise” (where the estimate total noise is in the equalized signal), as recited in claim 20.

Third, because Arambepola does not disclose an “equalized signal”, it additionally cannot disclose “a noise compensator operable to remove a portion of impulse noise from the equalized signal as a function of the estimated impulse noise”, as recited in claim 20 (emphasis added).

Fourth, for reasons similar to those discussed above regarding claim 1, while Nielsen may disclose an equalized signal, it does not disclose “a total-noise estimator operable to estimate total noise in the equalized signal from the equalizer”, as recited in claim 20.

Fifth, also for reasons similar to those discussed above regarding claim 1, while Nielsen may disclose an equalized signal, it does not disclose “an impulse-noise estimator operable to estimate impulse noise based on the estimated total noise” (where the estimate total noise is in the equalized signal), as recited in claim 20.

Sixth, Nielsen does not disclose “a total-noise estimator operable to estimate total noise in the equalized signal from the equalizer” (emphasis added). Instead, it discloses “remov[ing] or nullif[ying] any impulse noise that exceeds” a threshold that is “arbitrarily set based upon empirical data and the environment in which the system operates” from “the error signal developed by the error generator 28”. Nielsen, c. 2, l. 46 – c. 3, l. 3 (emphasis added). Applicant submits that because the noise is removed from the error signal developed by the error generator, it is not estimated in the equalized signal.

Seventh, Nielsen does not disclose “an impulse-noise estimator operable to estimate impulse noise based on the estimated total noise” (where the estimate total noise is in the equalized signal). Instead, it discloses “remov[ing] or nullif[ying] any impulse noise that exceeds” a threshold that is “arbitrarily set based upon empirical data and the environment in which the system operates” from “the error signal developed by the error generator 28”. Id. (emphasis added). Applicant submits that because the noise is removed from the error signal developed by the error generator, it is not estimated in the equalized signal.

Eighth, Nielsen does not disclose “a noise compensator operable to remove a portion of impulse noise from the equalized signal as a function of the estimated impulse noise” (emphasis added). Instead, it discloses “remov[ing] or nullif[ying] any impulse noise that exceeds” a threshold that is “arbitrarily set based upon empirical data and the environment in which the system operates” from “the error signal developed by the error generator 28”. Id. (emphasis added). Applicant submits that because impulse noise is removed from the error signal developed by the error generator, it is not removed from the equalized signal.

Ninth, Nielsen does not disclose “a noise compensator operable to remove a portion of impulse noise from the equalized signal as a function of the estimated impulse noise” (emphasis added). Instead, it discloses “remov[ing] or nullif[ying] any impulse noise that exceeds” a threshold that is “arbitrarily set based upon empirical data and the environment in which the system operates” from “the error signal developed by the error generator 28”. Id. (emphasis added). Applicant submits that because the threshold is arbitrarily set, it is not a function of the estimated impulse noise and, thus, a portion of the impulse noise is not removed from the equalized signal as a function of the estimated impulse noise.

Therefore, Applicant submits that no proper combination of Arambepola and Nielsen teaches or suggests “a total-noise estimator operable to estimate total noise in the equalized signal from the equalizer”, “an impulse-noise

estimator operable to estimate impulse noise based on the estimated total noise”, or “a noise compensator operable to remove a portion of impulse noise from the equalized signal as a function of the estimated impulse noise”, as recited in claim 20. Applicant further submits that the Office Action does not allege that Belotserkovsky, Frank, Greenwood, Nokes, Richards, Reuven, Schenk, Stopler, Toeltsch, and the other art of record overcomes the deficiencies discussed above with respect to Arambepola and/or Nielsen.

For all of these reasons (and those discussed above with regard to claims 1-19), Applicant submits that independent claim 20 is patentable under 35 U.S.C. § 103(a) over Arambepola, Belotserkovsky, Frank, Greenwood, Nielsen, Nokes, Richards, Reuven, Schenk, Stopler, Toeltsch, and the other art of record, either alone or in any proper combination. Applicant further submits that dependent claims 21-42 are patentable under 35 U.S.C. § 103(a) over Arambepola, Belotserkovsky, Frank, Greenwood, Nielsen, Nokes, Richards, Reuven, Schenk, Stopler, Toeltsch, and the other art of record, at least for the same reason that claim 20 is patentable, from which claims 21-42 directly or indirectly depend.

Rejection Under 35 U.S.C. § 103(a)—Claims 43-45

Applicant submits that the Examiner has failed to establish a proper prima facie case of obviousness of claim 43 for at least the following reasons.

The Office Action admits (at p. 19/§ 41) that Schenk fails to teach a down-converter.

Down-converter 190 in FIG. 5A of Reuven follows analog-to-digital converter 150. So, down-converter 190 is a digital down-converter, and its output is digital. However, claim 43 recites “a down-converter” and “an analog-to-digital converter [configured] to digitize output of the down-converter”. Thus, the output from the down-converter of claim 43 is not digital.

Therefore, the combination of Schenk and Reuven fails to teach or suggest all of the recitations of claim 43.

For at least this reason (and those discussed above with regard to claims 1-42), Applicant submits that independent claim 43 is patentable under 35 U.S.C. § 103(a) over Arambepola, Belotserkovsky, Frank, Greenwood, Nielsen, Nokes, Richards, Reuven, Schenk, Stopler, Toeltsch, and the other art of record, either alone or in any proper combination. Applicant further submits that dependent claims 44 and 45 are patentable under 35 U.S.C. § 103(a) over Arambepola, Belotserkovsky, Frank, Greenwood, Nielsen, Nokes, Richards, Reuven, Schenk, Stopler, Toeltsch, and the other art of record, at least for the same reason that claim 43 is patentable, from which claims 44 and 45 directly depend.

Rejection Under 35 U.S.C. § 103(a)—Claims 46-48

Applicant submits that the Examiner has failed to establish a proper prima facie case of obviousness of claim 46 for at least the following reasons.

First, Arambepola does not disclose a “partially-equalized signal”, as effectively admitted in the Office Action at p. 9/§ 4. Thus, Arambepola cannot

disclose “estimating impulse noise based on the partially-equalized signal”, as recited in claim 46 (emphasis added).

Second, because Arambepola does not disclose a “partially-equalized signal”, it also cannot disclose “removing a portion of the noise in the received MCM signal in a time domain as a function of the estimated impulse noise” (where the MCM signal has been partially equalized), as recited in claim 46 (emphasis added).

Third, the Office Action states: “Nielsen does teach this feature in Figures 1, 2 and 4” (Office Action, p. 9/§ 4). Applicant understands this statement to admit that while Nielsen may disclose a partially-equalized signal, it does not disclose “estimating impulse noise based on the partially-equalized signal”, as recited in claim 46.

Fourth, Nielsen does not disclose “estimating impulse noise based on the partially-equalized signal” (emphasis added). Instead, it discloses “remov[ing] or nullif[y]ing any impulse noise that exceeds” a threshold that is “arbitrarily set based upon empirical data and the environment in which the system operates” from “the error signal developed by the error generator 28”. Nielsen, c. 2, l. 46 – c. 3, l. 3 (emphasis added). Applicant submits that because impulse noise is removed from the error signal developed by the error generator, it is not estimated based on the partially-equalized signal.

Fifth, Nielsen does not disclose “removing a portion of the noise in the received MCM signal in a time domain as a function of the estimated impulse

noise” (where the MCM signal has been partially equalized) (emphasis added). Instead, it discloses “remov[ing] or nullif[ying] any impulse noise that exceeds” a threshold that is “arbitrarily set based upon empirical data and the environment in which the system operates” from “the error signal developed by the error generator 28”. *Id.* (emphasis added). Applicant submits that because impulse noise is removed from the error signal developed by the error generator, it is not removed from the partially-equalized signal.

Sixth, Nielsen does not disclose “removing a portion of the noise in the received MCM signal in a time domain as a function of the estimated impulse noise” (where the MCM signal has been partially equalized) (emphasis added). Instead, it discloses “remov[ing] or nullif[ying] any impulse noise that exceeds” a threshold that is “arbitrarily set based upon empirical data and the environment in which the system operates” from “the error signal developed by the error generator 28”. *Id.* (emphasis added). Applicant submits that because the threshold is arbitrarily set, it is not a function of the estimated impulse noise and, thus, a portion of the impulse noise is not removed from the partially-equalized signal as a function of the estimated impulse noise.

Therefore, Applicant submits that no proper combination of Arambepola and Nielsen teaches or suggests “estimating impulse noise based on the partially-equalized signal” or “removing a portion of the noise in the received MCM signal in a time domain as a function of the estimated impulse noise”, as recited in claim 46. Applicant further submits that the Office Action does not

allege that Belotserkovsky, Frank, Greenwood, Nokes, Richards, Reuven, Schenk, Stopler, Toeltsch, and the other art of record overcomes the deficiencies discussed above with respect to Arambepola and/or Nielsen.

For all of these reasons (and those discussed above with regard to claims 1-45), Applicant submits that independent claim 46 is patentable under 35 U.S.C. § 103(a) over Arambepola, Belotserkovsky, Frank, Greenwood, Nielsen, Nokes, Richards, Reuven, Schenk, Stopler, Toeltsch, and the other art of record, either alone or in any proper combination. Applicant further submits that dependent claims 47 and 48 are patentable under 35 U.S.C. § 103(a) over Arambepola, Belotserkovsky, Frank, Greenwood, Nielsen, Nokes, Richards, Reuven, Schenk, Stopler, Toeltsch, and the other art of record, at least for the same reason that claim 46 is patentable, from which claims 47 and 48 directly or indirectly depend.

**Applicant submits that the amendments and remarks in this Second Amendment render each of claims 1-48 allowable. If the Examiner does not agree, Applicant requests that the Examiner contact John A. Castellano, Reg. No. 35,094, at 703.668.8000—as soon as possible—in order to establish a mutually agreeable time for a personal interview at the USPTO.**



Request for Reconsideration and Allowance

Accordingly, in view of the above amendments and remarks, reconsideration of the rejections and allowance of each of claims 1-48 in connection with the present application is earnestly solicited.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

If necessary, the Director of the USPTO is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; in particular, extension of time fees.

Respectfully submitted,

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By

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